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WEB PAPER

Empathy in Iranian medical students: A preliminary psychometric analysis and differences by gender and year of medical school

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Abstract

Background: It has been well documented that effective empathic communication in the context of patient care is associated with improved health care outcomes. However, the emphasis given to empathy in medical education in Iran is limited, and the state of such teaching is unknown in many countries.

Aims: To determine the psychometric properties of an Iranian translation of the Jefferson Scale of Physician Empathy (JSPE) among medical students, and to examine the differences on mean empathy scores by gender and the different years of medical school.

Method: A cross-sectional study was conducted among medical students. Data analysis was based on 181 questionnaires. Principal component analysis (PCA) with Varimax rotation was used to identify the number and composition of components constituting the developed constructs.

Results: The PCA yielded three factors: *Compassionate care, perspective-taking, and the ability to walk in the patient's shoes*. No statistically significant differences in the empathy means scores were found by gender and the different years of medical school.

Conclusions: The Persian version of JSPE is a psychometrically sound instrument to measure empathy. Cultural backgrounds and pedagogical practice may influence medical students' attitudes towards empathy. Some recommendations are made, and the study limitations are discussed.

Background

An emerging paradigm views empathy as the backbone of patient care and natural human emotion (Spiro 2009) in the context of the doctor–patient relationship. Patients' experiences in a qualitative study showed that empathy is fundamental to the quality of personal care in general practice (Tarrant et al. 2003). Evidence-based studies also showed that effective empathetic patient care is associated with improved health care outcomes (Squier 1990; Colliver et al. 1998; Mercer & Reynolds 2002; Halpern 2003; Kim et al. 2004). Although there is uncertainty about the definition of empathy, it has been conceptualized as a two-dimensional model, comprising cognitive and affective components (Gladstein 1983). According to Gladstein, the cognitive component refers to “intellectually taking the role or perspective of another person” whilst the affective component is “responding with the same emotion to another person's emotion.” It has been argued, however, that the affective element is an integral component of sympathy rather than empathy. A detailed distinction between empathy and sympathy in the context of

Practice points

- The Persian version of JSPE is a psychometrically sound instrument to measure empathy among medical students.
- Cultural backgrounds and pedagogical practice may influence medical students' attitudes towards empathy.
- Although previous studies and this study showed that women scored higher on the empathy scales than men, there is no evidence in the literature for gender differences in empathy in real-life settings.
- The cross-sectional nature of this study did not permit us to identify whether or not empathy changes during medical school. Further, longitudinal study designs are required to follow up cohorts to identify possible empathy changes.
- Ethnographic and phenomenological inquiry approaches are needed as a complement to the JSPE to explore the more subjective elements of empathy among medical students.

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patient care has been published elsewhere (Chismar 1988; Hojat et al. 2003) and will not be addressed here.

Although twenty measures have been used to assess the empathy levels of healthcare professionals (Yu & Kirk 2008), the Jefferson Scale of Physician Empathy (JSPE) has been specifically constructed in the context of the doctor–patient relationship and patient care (Hojat et al. 2002a). Over the past 10 years, the JSPE has been used in several settings to measure empathy among health professionals. The JSPE enables medical educators to “evaluate the effectiveness of educational interventions aimed at promoting empathy.” They can also use the scale in order to examine the variation and correlation of empathy in different years of medical education by gender (Hojat et al. 2002b).

The JSPE possesses sound psychometric qualities for measuring empathy in the health care setting (Hojat 2007). In reviewing the literature on the JSPE, for example, studies show that the empathy mean scores are decreased as students move on to the following years (Hojat et al. 2004; Sherman & Cramer 2005; Chen et al. 2007; Hojat et al. 2009). Similar declines have also been reported in different years of residency training (Mangione et al. 2002). However, the reduction in the empathy mean scores have not been observed during medical school in Japanese students (Kataoka et al. 2009). Evidence on male–female differences of empathy reveals that women have higher scores of empathy than men (Hojat et al. 2002b, 2002c; Alcorta-Garza et al. 2005; Sherman and Cramer 2005; Hojat 2007; Di Lillo et al. 2009; Kataoka et al. 2009).

Collectively, although there are inconsistent findings in these studies, medical students had moderately high scores towards empathy (the empathy mean scores on the JSPE were higher than 100 out of 140). In contrast to this, little is known about empathy in Iranian medical education, where the culture and medical education differs greatly from that of the West. In Iran, the attention given to “cross-gender dyads” in doctor–patient interaction is severely limited. Only women can be obstetricians and gynaecologists. Sensitivity to religious matters is particularly important in Iranian doctor–patient relationships. Notwithstanding the progress of medical education internationally, nearly all Iranian medical schools offer courses based on the traditional system; a crowded, highly structured curriculum in which subjects are taught as a series of isolated disciplines with a divide between preclinical and clinical teaching. Communication skills courses have not been specifically integrated into the curriculum. The current status of medical education in Iran has been published elsewhere and, therefore, will not be described here (Tavakol et al. 2008; Tavakol 2009).

Whereas many studies concerning empathy in patient care have been carried out in Western countries, medical student empathy has not been measured in Iran. In Iran, there is no valid and reliable measure of empathy in patient care. Therefore, the validation of a brief, reliable scale, such as the JSPE, could contribute to knowledge of medical student empathy. Indeed, the use of this scale can provide a good opportunity to compare empathy in patient care between different countries. Therefore, the purpose of this study was to examine the validity and reliability of an Iranian translation of

the JSPE. Consistent with the aforementioned studies, we tested two hypotheses: Hypothesis A was that female medical students show higher levels of empathy than do men. Hypothesis B was that medical students in different years of medical school show a decline in empathy.

Method

Participants

The study’s design was quantitative in approach. The study was conducted in Shahrekord University of Medical Science, Iran. The total population of medical students was invited to participate in this study. There were 181 (127 women, 52 men, 9 missing values) students who participated in the study, representing 52.2% of the total (217 women, 130 men). In terms of medical school year, 20.4% (37) were in the first year, 19.3% (35) were in the second year, 21% (38) were in the third year, 19.3% (35) were in the fourth year, 16.6% (30) were in fifth year and 3.3% (6) were missing data. Medical students did not receive any reward for their participation in the study.

Instrument

The student version (S-version) of the JSPE was used to examine its psychometric properties and to identify male–female differences of empathy in different years of medical school. It is a self-administered inventory that contains 20 items. Negative and positive items were equally phrased. Medical students rated each item on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). For negative items, the scoring is reversed (1 = strongly agree, 7 = strongly disagree). The JSPE was originally developed in 2001 to measure medical students’ attitudes about physician empathy in a patient-care situation. Items included in the scale were derived from an extensive review literature followed by studies with groups of physicians, medical students and residents (registrars) (Hojat et al. 2001; Hojat et al. 2002c). The scale has been validated and found to be reliable in USA, Mexico and Japan (Hojat et al. 2001; Alcorta-Garza et al. 2005; Kataoka et al. 2009) and takes approximately 5–7 min to complete.

Procedures

The study was approved by Shahrekord University of Medical Science. The JSPE was translated into the Persian language. It was back-translated by one of the authors (MT) who possesses extensive translation experience from English to Persian. The translation accuracy was approved by the two bilingual researchers. The Persian version was distributed to all medical students. The principal investigator employed two medical students to collate the data. To this end, the students were trained by the principal investigator. The students distributed questionnaires to medical students during class time. The participants were provided with a plain Persian language statement that provided a brief outline of the study including its purposes. We assured medical students that anonymity would be maintained throughout the study. We also emphasized

that participating in the study was entirely voluntary and would have no influence on the progress of their medical studies. They were instructed not to identify themselves in any manner except age, sex and medical school year. We explained to the students that the findings of the study would be used to make international comparisons of attitudes towards empathy in patient care. Students were asked to return their completed scales to the principal investigator (MR). They were also informed that the return of the scale would indicate their consent to participate.

Analysis

Medical students' responses to the JSPE were coded and entered into SPSS version 17. Missing data related to demographic information were coded as missing and excluded from relevant analysis. The missing data of the items were replaced with the mean. However, those students who did not provide a response to four or more items were excluded from subsequent analysis. Descriptive analyses were conducted on all items.

Evaluation of the internal structure and composition of the JSPE was conducted in four steps. First, Bartlett's test of the sphericity and the Kaiser–Meyer–Olkin measure of sampling adequacy were determined to measure the appropriateness of factor analysis. Second, the principal component analysis (PCA) was run on items 1–20 to extract the number of components. Third, retained components were submitted to a Varimax rotation to obtain more interpretable “simple structure.” The magnitude of the factor pattern coefficients was used in this study to establish which variables are substantially related to a given factor and thus should be included in the interpretation (Hogarty et al. 2005). Owing to studies show that the Eigenvalues > 1 rule ($EV > 1$) always severely overestimated the number of components to retain (Henson & Roberts 2006) and to find the best interpretable solution, the $EV > 1.5$ rule was used to retain the number of components in this study. In addition, factor coefficients of 0.45 or greater were required for the interpretation of suggested components (Hogarty et al. 2005). Finally, the internal consistency reliability of the scale was established with items reflecting empathy domains. An alpha of 0.70 or greater is considered to be an acceptable reliability coefficient (Nunnally 1978). What is more, we used an unpaired *t*-test to compare whether gender differences were significant in empathy scores. Multivariate analysis of variance (MANOVA) was performed to explore the effect of gender and student year on the JSPE scores simultaneously.

Results

Principal components analysis

To assess the appropriateness of using PCA on data, the Kaiser–Meyer–Olkin analysis was performed, yielding an index of 0.74. Bartlett's test of sphericity was highly significant, $\chi^2(190) = 719.14$, $p < 0.0005$. Hence, the distribution of data fulfilled the psychometric criteria for PCA to proceed. The PCA yielded three factors that accounted for 38% of the

variance (Table 1). Inspection of the factor coefficients in Table 1 shows that factor 1, which accounted for 15.6% of the variance, contains seven both positively and negatively worded items with factor coefficients ≥ 0.50 characterized by *compassionate care* (CC) in the doctor–patient relationship. By contrast, in American, Italian, Mexican, and Japanese medical students and physicians, the construct of CC emerged in the second factor (Hojat et al. 2002c; Alcorta-Garza et al. 2005; Hojat 2007; Di Lillo et al. 2009; Kataoka et al. 2009). Factor 2, which accounted for 14.1% of the variance, consisted of six positively worded items with factor coefficients ≥ 0.55 labelled as *perspective-taking* (PT), a construct that has been explained as a key component of empathy in the context of patient care and the doctor–patient relationship (Hojat 2007). Contrary to expectations, this factor emerged as a significant factor in the aforementioned studies. The third factor, which accounted for 8.3% of the variance, consisted of only three negatively worded items with factor coefficients ≥ 0.49 interpreted as *the ability to walk in the patient's shoes* (AWPS), which emerged in American, Italian and Japanese samples (Hojat et al. 2002c; Hojat 2007; Di Lillo et al. 2009; Kataoka et al. 2009). Community values showed that most items accounted for a satisfactory proportion of variance and were well defined by the factor. Only items 18 and 19 had a communality value lower than 0.40. As shown in Table 1, the constructs of CC and PT presented an acceptable internal consistency.

Description of Component Scores

Means and standard deviations (SDs) for each of the three components are presented in Table 2. The highest mean component score was gained on the construct of CC. On average, medical students strongly agreed with statements indicating that physicians should try to understand the emotional status of the patient, and to pay attention to the nonverbal communication to improve patient's functioning. Students also quite strongly agreed that empathy is “a therapeutic skill” in the context of patient care. The second highest mean component score was obtained on the PT approach. Students fairly strongly agreed that physicians should understand and adopt the patient's point of view. Students quite strongly agreed with the statement that “patients feel better when their physicians understand their feelings.” The lowest score mean component score was obtained on the AWPS. Accordingly, students felt “neutral” about stepping inside the patient's shoes to see medical practice through the patient's eyes. Correlations between each of the three subscales (components) are outlined in Table 3. Most of the correlation coefficients were significant. Based on the magnitude of the coefficients the strength of the association was greatest between the following scales: CC and PT; and CC and AWPS.

Description of item scores

Mean and SD for each the 20 item of the JSPE are presented in Table 1. Students rated their level of agreement to each item on a seven-point scale. Students could obtain a score of 1 to 7 for each item and a possible total score ranging 20–140. The mean empathy score was 105.1 (SD = 12.9), denoting a

Table 1. Factor pattern coefficients, mean and SD, and communalities (h^2) for principal components extractions with Varimax rotation on the 20 items of the JSPE and Cronbach α values ($n = 181$).^a

No.	Item	Factor 1	Factor 2	Factor 3	Mean/SD	h^2
11	Patients' illnesses can be cured only by medical or surgical treatment; therefore, physicians' emotional ties with their patients do not have a significant influence in medical or surgical treatment ^b	0.66	0.00	0.00	5.2/2.0	0.56
12	Asking patients about what is happening in their personal lives is not helpful in understanding their physical complaints ^b	0.61	0.00	0.00	5.1/1.6	0.53
14	I believe that emotion has no place in the treatment of medical illness ^b	0.60	0.00	0.00	6.0/1.3	0.54
10	Patients value a physician's understanding of their feelings which is therapeutic in its own right	0.55	0.00	0.00	5.9/1.5	0.56
8	Attentiveness to patients' personal experiences does not influence treatment outcomes ^b	0.53	0.00	0.00	5.5/1.4	0.40
7	Attention to patients' emotions is not important in history taking ^b	0.53	0.00	0.00	5.9/1.5	0.41
2	Patients feel better when their physicians understand their feelings	0.50	0.00	0.00	6.4/1.1	0.42
4	Understanding body language is as important as verbal communication in physician patient relationships	0.00	0.00	0.00	5.5/1.5	0.44
19	I do not enjoy reading non-medical literature or the arts ^b	0.00	0.00	0.00	6./1.5	0.32
5	A physician's sense of humour contributes to a better clinical outcome	0.00	0.00	0.00	5.4/1.5	0.42
16	Physicians' understanding of the emotional status of their patients, as well as that of their families is one important component of the physician-patient relationship	0.00	0.66	0.00	5.4/1.5	0.55
20	I believe that empathy is an important therapeutic factor in medical treatment	0.00	0.66	0.00	6.0/1.2	0.45
17	Physicians should try to think like their patients in order to render better care	0.00	0.64	0.00	4.1/1.7	0.50
13	Physicians should try to understand what is going on in their patients' minds by paying attention to their non-verbal cues and body language	0.00	0.61	0.00	4.6/1.7	0.46
9	Physicians should try to stand in their patients' shoes when providing care to them	0.00	0.57	0.00	4.4/1.7	0.44
15	Empathy is a therapeutic skill without which the physician's success is limited	0.00	0.55	0.00	5.3/1.7	0.41
3	It is difficult for a physician to view things from patients' perspectives ^b	0.00	0.00	0.76	4.3/1.7	0.61
6	Because people are different, it is difficult to see things from patients' perspectives ^b	0.00	0.00	0.55	4.3/1.6	0.42
1	Physicians' understanding of their patients' feelings and the feelings of their patients' families does not influence medical or surgical treatment ^b	0.00	0.00	0.49	5.1/2.0	0.44
18	Physicians should not allow themselves to be influenced by strong personal bonds between their patients and their family members ^b	0.00	0.00	0.00	3.3/1.6	0.37
Percentage of variance		15.6	14.1	8.3		
Cronbach's α values		0.73	0.71	0.51		

Notes: The factor (component) labels are as follows: F1 compassionate care; F2 perspective taking; and F3 indicates AWPS.

^aThe factor pattern coefficients of 0.44 and below were replaced by 0s.

^bItems were reverse scored (strongly agree = 1, strongly disagree = 7).

Table 2. Means and SD for JSPE components scores ($n = 181$).

Component	Mean	SD
Compassionate care	41.0	6.1
PT	30.0	6.1
AWPS	14.0	3.6

Table 3. Correlation between subscales scores ($n = 181$).

Subscale	CC	PT	AWPS
CC			
PT	0.40**		
AWPS	0.18*	0.11	

Note: * $p \leq 0.01$; ** $p \leq 0.005$.

Table 4. Comparison of results of previous studies using the JSPE from different countries.

Country	Mean	SD
American ^a	115.0	10.0
Mexican ^b	110.4	14.1
Iran	105.1	12.9
Japan ^c	104.3	13.1

Note: ^aHojat 2007; ^bAlcorta-Garza et al. (2005); Kataoka et al. (2009).

relatively "high" scores overall. Just under 2.8% ($n = 5$) of students had a score of 80 or less, potentially indicating "low" scores on the JSPE. The mean empathy scores on the JSPE were compared with other students across countries in previous studies (Table 4).

Although female students had a higher level of empathy than did male students (105.6 *vs.* 103.7; Table 5), the difference in mean scores was not statistically significant. The highest mean score by gender was on the item 2, "Patients feel better when their physicians understand their feelings" (mean for females = 6.5, mean for males = 6.2). The lowest score was on the item 18, "Physicians should not allow themselves to be influenced by strong personal bonds between their patients and their family members" (mean for female = 3.3, mean for male = 3.1). Table 5 compares the results obtained from the background demographic of medical school year. As shown in the table, the mean empathy scores slightly declined from 106

Table 5. The background demographic of empathy mean scores ($n = 181$).

Demographic variables	No.	Mean/SD
Gender		
Female	52	105.6/13.7
Male	127	103.7/11.0
Medical year		
First	37	106.0/13.11
Second	35	102.0/13.8
Third	38	106.5/14.2
Fourth	35	105.2/11.8
Fifth	30	106.0/12.0

Table 6. The background demographic of empathy mean components scores ($n = 181$).

Demographic variables	Compassionate care	PT	Walk in patient's shoes
	Mean/SD	Mean/SD	Mean/SD
Gender (No.)			
Male (52)	5.8/0.72	4.8/0.90	4.1/1.1
Female (127)	5.9/0.93	5.0/1.0	4.3/1.0
Missing (2)			
Medical school year (No.)			
First (37)	5.9/0.80	5.0/1.1	4.4/0.96
Second (35)	5.6/1.0	4.9/0.81	4.0/1.1
Third (38)	5.9/0.93	5.0/1.2	4.6/1.0
Forth (35)	6.0/0.75	5.0/1.2	4.1/1.0
Fifth (30)	5.8/0.80	5.0/0.87	4.2/1/1
Missing (6)			

in the first year to 102 in the second year and then increased to 106 in the fifth year. However, a statistically significant main effect for gender and medical school year on the JSPE scores was not found. MANOVA was also performed to explore the effect of gender and medical school on these empathy underlying components (factors). There was no a statistically significant main effect for gender and medical school year simultaneously on mean scores for the components CC, PT, and AWPS (Table 6).

Internal consistency

After reversing the negatively worded items on the JSPE, the Cronbach coefficient alpha, a measure of internal consistency reliability, was gauged to assess the homogeneity of data sets on the scale. The value of alpha was 0.74, indicating a satisfactory reliability. A similar reliability index was estimated for Mexican medical students ($r_\alpha = 0.74$). Our coefficient alpha is lower than that reported for American and Japanese medical students ($r_\alpha = 0.80$). Item-total score correlations of the Persian translation of the JSPE ranged from 0.152 to 0.556, and all were positive and statistically significant ($p < 0.05$). As shown in Table 1, the internal consistency reliability for the components CC, PT, and AWPS was 0.73, 0.71, and 0.51, respectively.

Discussion

Psychometrics of an Iranian translation of the JSPE

The aim of this study was to examine the reliability of an Iranian translation of the JSPE. To our knowledge, this study was the first study investigating empathy in the context of patient care in Iran. The reliability of the JSPE was supported by the quite high internal consistency of the scale ($r_\alpha = 0.74$). The Persian version of the JSPE proved to be psychometrically sound and the construct validity of the scale was supported by replicating the three factors that emerged in American, Mexican, and Japanese medical students.

Results from the PCA exposed three latent components composed of relatively homogenous items. Communalities and factor pattern coefficients were, by and large, high and all components consisted of three or more items. Despite strong results from the PCA, only two of the components showed satisfactory internal consistency. The value of α revealed unacceptable internal consistency of items composed the AWPS. This could be due to the rule that the value of α correlates positively with the number of items (Garson 2009). Similar latent components were emerged in American, Mexican, and Japanese samples. However, these studies have not reported the value of α for each component.

Contrary to our expectations, the descriptive findings of components showed that medical students rated “*compassionate care*” as a major element of empathy in the context of patient care and the doctor–patient relationship. In contrast to our study, the *PT* component emerged as a major dimension of empathy in American medical and dental students and physicians (Hojat et al. 2002a; Sherman & Cramer 2005; Hojat 2007), Mexican medical students (Alcorta-Garza et al. 2005) and Japanese medical students (Kataoka et al. 2009). One might question how Iranian medical students arrive at compassion as a major component of empathy in patient care when the curriculum concentrates more exclusively on a biomedical approach rather than a bio-psycho-social one and the fact that communication skills is not specifically integrated into the curriculum. Although more detailed answers to this question requires a series of ethnographic studies, it can be argued that compassion is part of a “natural disposition that intuitively informs patient care” and develops over time (Chochinov 2007). This may also be attributed to the fact that religious beliefs lead medical students to display compassion because God will judge people’s behavior at the end of time.

Empathy mean scores

Medical students in previous studies and this study scored higher than average on the JSPE. In order to understand this further, it suggests a naturalistic study where an observer watches a student interact with patients followed by the administration of the JSPE is to measure their empathy. This may elucidate factors such as personal dispositions and the effect of the context in eliciting empathic behavior. Further analysis shows that the mean empathy score of Iranian medical students is lower than American and Mexican medical

students, respectively, but slightly higher than Japanese medical students. This may be attributed to differences in terms of student selection, pedagogical methods, role modeling, and cultural issues. Regardless of differences in pedagogical methods in Iranian medical students, anecdotally, the majority of Iranian patients want to be cured rather than have doctors empathizing with their emotions. This might affect the empathy mean score among Iranian medical students. This factor has been reported in the culture of Japanese patients and perhaps explains why there is no difference between Iranian and Japanese medical student in their empathy mean scores (Kataoka et al. 2009).

Hypothesis A: Female medical students show higher levels of empathy than do men

Students' mean responses to items comprising the three constructs (CC, PT, and AWPS) do not support the hypothesis, despite female students scoring slightly higher than males. Although our results differ from studies published in America (Hojat et al. 2001; Hojat et al. 2002b; Hojat et al. 2002c; Sherman & Cramer 2005; Chen et al. 2007; Hojat 2007), Mexico (Alcorta-Garza et al. 2005) and Japan (Kataoka et al. 2009), they are consistent with those of published studies in Italy and American pharmacy students (Lonie et al. 2005; Di Lillo et al. 2009). In the light of previous studies, we expected a statistically significant association between gender and the empathy mean scores on the JSPE. Lack of a statistically significant relationship may be attributed to sampling bias (i.e., the high proportion of female students to male students produced biased information). This difference may also suggest there are particular factors unique to US medical training that generates a significant difference in empathy between male and female students. However, the reason for difference in the empathy mean scores between female and male is fuzzy in the literature, but it may be result of "motivational differences" rather than "simple differences of ability between men and women" (Klein & Hodges 2007). More importantly, the understanding of male-female differences is perplexing owing to the lack of a theory predicting and explaining gender-based differences in empathy. More to the point, an increasing number of findings from neuroscience have supported new thinking regarding empathy, including the source of human empathy in the brain. Individual mirror neurons now play a key role in firing the shared neural circuits of the brain. These circuits "constitute one important component of the cognitive architecture underlying empathy" (Jackson et al. 2006; Slack 2007). It seems likely that future findings from affective neuroscience may shed more light on a better understanding of the mechanisms underlying gender-based differences in empathy – is it a matter of gender or sex? Furthermore, although previous studies and this study showed that women scored higher on the empathy scales than men, there is no evidence about gender differences in empathy in real-life settings. Qualitative studies of empathy in a naturalistic, real-life setting using audio-or videotaped patient encounters can explore whether or not women are more empathetic than men.

Hypothesis B: Medical students in different years of medical school show a decline in empathy

The results were contrary to expectations that students would develop more empathy as their training progressed. The empathy mean scores were not statistically significant during medical school. This does not prove the hypothesis, much as a decline in the empathy mean scores occurred in the second year students. This finding is not in agreement with Hojat's longitudinal findings in American medical students which showed a significant decline in the empathy mean scores in the third year of medical school (Hojat et al. 2009). Moreover, these findings pertaining to Hypothesis B contradict those of published studies in American medical students (Hojat et al. 2004; Chen et al. 2007), American dental students (Sherman & Cramer 2005) and Japanese medical students (Kataoka et al. 2009) which showed significant relationships between empathy and medical school year. However, these findings are consistent with those of Newton and colleagues (Newton et al. 2000), who found a similar relationship between empathy and medical school year in their study. In addition, the results showed that students' mean response to items comprising the three constructs (CC, PT, and AWPS) did not change significantly in different years of medical school. There are several possible explanations for this result. First and most importantly, the cross-sectional nature of study did not permit us to identify whether or not empathy change during medical school. Further longitudinal study designs are required to follow up the same cohort during medical school to identify empathy changes. Second, acceptance into medical school is just based on students' declarative knowledge rather than their character. Third, curricula are mostly of a post-Flexnerian design; that is, the teaching and learning of basic sciences prior to the teaching and learning of clinical sciences. Fourth, early clinical and professional development is not integrated into the curriculum. Finally, communication skills training courses are not found within the current undergraduate medical curriculum in Iran. Taken together, these reasons indicate why the empathy mean scores were not significant compared with American medical students, where medical schools curricula, student selection and training of medical students and in particular the importance that placed on communication skills, are entirely different from the training of Iranian medical students. Notwithstanding the great progress of American medical education, there are still barriers to practice empathy, including failing to instruct empathy, lack of enough role models, pessimistic experiences, time strain, and overreliance on technology (Crandall & Marion 2009). This suggests further empirical studies are required across the world to better understand the epistemological and ontological issues are raised concerning empathy and its barriers. The vast majority of quantitative approaches addressing empathy have not provided much opportunity for in-depth inquiry, which is essential for exploring the meanings, views, and attitudes of medical students and physicians concerning developing and enhancing empathy in patient care. We therefore recommend ethnographic and phenomenological studies of student doctors' own experiences and meanings of empathy in patient care.

Limitations

This study has methodological limitations that must be taken into consideration when interpreting the findings. One cannot over-emphasize the limitations of self-report as this may limit the validity of findings. Respondents for various reasons may under, or overestimate the practice of empathy. A methodological problem frequently associated with the use of self-report measures, which may have been evident in this study, is the inability to determine the extent to which responses accurately reflects the respondents' experiences and expectations of their empathy owing to social desirability and inaccurate recall. This warrants further research to examine how emotions are communicated in interactive situations. Our findings may be somewhat limited in generalizability because they were derived from only one medical school. The internal consistency estimate for the AWPS component was unacceptable; however, as pointed out earlier, this may be due to the small number of items embracing the component.

The response rate slightly was low (52.2%), despite our efforts to maximize it and this means that the findings should be interpreted with caution. A possible explanation for this might be that students have been receiving too many questionnaires to participate in different studies. The number of questionnaires received tends to increase as faculty members are under pressure to publish material to promote their positions. It seems that students had a negative attitude toward these survey questionnaires as they felt that no educational action has been taken by course planners for improving their training using the outcomes of the survey questionnaires. Here, two students commented on two of our questionnaires:

As a third medical student, I have filled out about 10-20 questionnaires so far, but I have not seen any effect on our training. It is better to pay attention to improve our education instead of these pointless attempts. (A third year male student)

Another student reflected:

These questionnaires have not had an effect on the scientific and educational status of the students so far! You do it, please! (A third year male student)

Besides, non-respondents to the scale may also be less interested or involved in empathy, and therefore the reported extent of the empathy mean scores in this study may be lower than in reality.

Conclusions

The Persian version of JSPE is a psychometrically sound instrument to measure empathy. It can be used as part of the evaluation of empathy development and its implementations, contributing to an expansion of the epistemological understanding of empathy, which ultimately may improve the process of responding empathetically to patients. However, to uncover, for example, why women are more empathetic than men and to gain a richer description of medical students' experiences, perceptions and meaning of empathy, qualitative methods are required as a complement to the JSPE. The lack of a relationship between gender and the augmentation of

empathy during medical school and the empathy mean scores in some studies including this report thought to be related to sampling bias, cultural characteristics and medical education issues. In a country like Iran, with strictly demarcated gender roles and where women are more comfortable approaching women than they are approaching men, students may show different responses to empathy with the same gender patient. Further qualitative and quantitative research studies from large representative samples are therefore recommended.

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